# Notes from the Last Three BWG Meetings

## Biogenic Working Group Thirtieth Conference Call

Staff from Research and Planning and Technical Support Divisions (RD & PTSD), UCLA-UC Cooperative Extension (UCCE), and UC Berkeley (UCB) held the 30th Biogenic Working Group (BWG) conference call on April 18, 2001.

**UCLA-UCCE Leaf Area Index (LAI) Measurements & GAP Vegetation Map Analysis**

In meetings with UC Davis Urban Forestry (UCDUF) group, much of the UCLA-UCCE protocols involving the LAI instruments, digital plant photography, and other approaches were mostly validated. UCLA-UCCE prefer LAI 2000 instrument for this work. GAP uncertainty in proper species identification is a continuing concern. Although Cal Veg Vegetation map products may have better species resolution than GAP, they are available for fewer areas in the state than GAP. A vegetation workshop at Cal/EPA building in Sacramento within the next three months would bring together the experts from United States Forest Service and California Department of Forestry and best serve a satisfactory resolution of vegetation mapping issues. Research Screening Committee (RSC) has now approved the UCLA-UCCE draft final report (DFR) praising the report's style and substance. The BWG comment period would close on April 27th, 2001.

**UCB DFR and New Project**

Staff review of the UCB excellent and comprehensive report has been completed for RSC review. Upon completion of internal review and with UCB permission, we solicit comments from BWG members. During staff review of the report, substantial depth of UCB activity and breadth of the expertise and scientific questions studied at Blodgett Forest became clearer. Aside from a state-of-the-art net effect of air pollution effect on plants experimental station, Blodgett Forest is also an Ameri-Flux CO2 and water vapor flux information site and a locus of UCB Center for Forestry activity. Other groups at UCB are also engaged in CO2 and water vapor flux measurement work in two sites in southern Sacramento. UCB group is working on making their databases and information widely available perhaps through their web site. PTSD staff will present to the RSC a digest of the UCCE work in central California when the final report is completed. PTSD staff will also present the outlines of the new UCB project on terpenes (biogenic aerosol) to the RSC within the next 90 days.

**Urban Forestry and Carbon Sequestration**

As an instrument of global warming emissions control, Professor Winer spoke to us about carbon sequestering through large-scale tree planting among other remedies. South Coast Air Quality Management District (SCAQMD) has a Cool School program that provides $350,000 to the Tree People organization to plant trees around schools. There are many similar programs all around California as a way to reduce additional air conditioning burden on California's energy supplies. It is however critical that these programs choose low emitting as well as low water use and fast growing plant species for these large-scale plantings. Staff would work with the Tree People, UCDUF, and UCB Center for Forestry to develop appropriate programs in this area.

**Biogenics Day**

As part of the effort to explain the critical role of vegetation on species specific emissions, deposition, and carbon sequestration, professor Arthur Winer (UCLA), professor Allen Goldstein (UCB), and Dr. John Karlik (UCCE) will make presentations on the biogenic emissions work done on July 11th, 2001.

## Biogenic Working Group Twenty Ninth Conference Call

Staff from Research and Planning and Technical Support Divisions (RD & PTSD), UCLA-UC Cooperative Extension (UCCE), and U.S. EPA held the 29th Biogenic Working Group (BWG) conference call on March 14, 2001.

**Secondary Organic Aerosol (Model) Select Group**

Biogenic aerosol formation may involve less complex path ways of biogenic hydrocarbon emissions to secondary organic aerosol (SOA) than formation process for the soup of anthropogenic, geogenic, and biogenic emissions to SOA in urban environments. In this way, the biogenic aerosol development is a progenitor of the SOA development for urban environments.

To develop doctrines in this area, we have decided to ask the following distinguished experts and investigators to join the Select Group: Allen Goldstein (UC Berkeley), Ajith Kaduwela (ARB), Anthony Wexler (UC Davis), Michael Benjamin (ARB), Betty Pun (AER), Jinyou Liang (ARB), Frank B (U.S. EPA). If they deign to be so generous to work in this task force, these selected invitees would in the coming months develop the core doctrines of SOA simulation platform, specify input data required, and develop how the SOA model would interact with the larger ozone and PM2.5 simulations. To use their vision of the aerosol and visibility simulation platform development at ARB, the SOA Select group will be occasionally joined by Tony VanCuren and Nehzat Motallebi of ARB's RD.

**UCLA-UCCE Draft Final Report**

UCLA-UCCE draft final report has been disseminated to the Research Screening Committee. The report includes successful application of photo ionization detection (PID) measurements of emission rates for 200 new plant species. PID measurements verified the usefulness of taxonomic method for 60 species already measured. Volumetric method is satisfactory for most urban forests and some wild land plant species. Additional issues have been raised with regards to the GAP GIS vegetation maps. We have began serious considerations of augmenting substantial portions of GAP with Cal Veg GIS vegetation maps developed by United States Forest Service (USFS) and California Department of Forestry.

**Terpene Emission Inventories**

We agree that because mono terpene emission rates are usually low and the measurements have not been as reliable (require gas chromatography (GC) measurements) as isoprene measurements, terpenes emission rate database is less well populated than the comparable isoprene database. Yet, from the SoCAB biogenic emission inventories, we suspect an important role for terpene emissions in ozone formation and we suspect an even bigger role for mono and sesqui terpenes in aerosol formation leading to PM2.5. A new PTSD project with UC Berkeley at Blodgett Forest includes chemically speciated terpene emission inventory data collection on a continuous four season basis and will be coupled with a UC Berkeley National Science Foundation (NSF) effort to collect total terpene emission inventory data. UC Berkeley is currently comparing their chilled GC measurements with our standard techniques at Folsom air quality station in Sacramento.

The NSF project would use Proton Transfer Reaction Mass Spectroscopy (PTRMS) as the instrument of choice; PTR MS is currently in use at Oregon Graduate Institute (OGI) and National Center for Atmospheric Research in similar applications. This is a critical step in validating and improving terpene compartment of the Biogenic Emission Inventory through Geographic Information Systems (BEIGIS). Because terpene BEIGIS simulations feed into the SOA simulations, the UC Berkeley program includes an aerosol size and number characterization program. For the past two years, RD has supported the UC Berkeley program at Blodgett Forest that includes full ecosystem measurements, relaxed eddy correlation flux data collection, and nitrogen species assessments.

**U.S. EPA ARB Cooperation**

EPA has mostly completed coding Biogenic Emission Inventory Systems (BEIS) III incorporating best aspects of GloBEIS and may soon make a beta version available on the web. PTSD and EPA are critically interested in comparison of EPA's Biogenic Emission Landuse (BEL) III with GAP and with Cal Veg concentrating on areas where UCLA-UCCE have completed field studies. BEL III uses USFS forest GIS vegetation map products and forest density information. UCLA-UCCE report is thus a critical part of this comparative analysis.

**Net Effects Presentations to the Board**

This presentation is set for June 28-29, 2001 and Dr. Arthur Winer will make a presentation to accompany the staff presentation. Dr. Winer will present information comparing emissions, deposition, and CO2 sequestration for various plant species.

UCLA-UCCE and UCB will present seminars on their work sometime in early May, 2001on the same day. We invite all ARB staff to attend. Next BWG Conference call is scheduled for March 14, 2001.

**Biogenic Working Group Twenty Eighth Conference Call**

Staff from Research Division (RD), UCLA-UC Cooperative Extension (UCCE), UC Berkeley (UCB), and Oregon Graduate Institute (OGI) held the 28th Biogenic Working Group (BWG) conference call on November 22, 2000. We have now completed arrangements for the Research Planning Workshop at ARB between December 13 to 14, 2000. UCLA-UCCE research group will soon complete a draft final report on the Phase III of the project. UCB research group has continued to collect data during the winter months to seasonal events. UCB staff would present four papers during the American Geophysical Union annual meeting at San Francisco in December 2000; (1) biogenic v. anthropogenic hydrocarbon contribution to acetone formation (acetone is important for free radical chemistry), (2) ozone deposition, (3) ethanol, and acetaldehyde emissions from pines, and (4) observed isoprene oxidation to ozone.

We discussed ARB biogenic aerosol program that emphasizes collecting ambient terpene data using new methods (Proton Mass Spectrometry) that would support total and speciated terpene emission inventories that then would be input into secondary organic aerosol models (SOA) and would produce a biogenic aerosol fraction of PM2.5. We would also collect aerosol size and chemical composition information using several techniques including Scanning Mobility Particle Sizer (SMPS) and Atmospheric Time of Flight Mass Spectrometry that would validate the SOA model. In this process, we would know if biogenic aerosols form a substantial fraction of PM2.5 in California.

UCLA-UCCE and UCB will present seminars on their work sometime in early April, 2001on the same day. We invite all ARB staff to attend. Next BWG Conference call is scheduled for February 6, 2001.